Space Weather Forecast

Issued on Monday, 13 February 2023 at 13:23 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Slight chance of Strong flares (R3 Radio Blackout) with Moderate flares (R1/R2 Radio Blackouts) likely. Chance of G1/Minor Storm and slight chance of G2/Moderate Storm on Days 1 and 2 (13-14 Feb).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was Moderate during the period, with a few low-level M-flares. There are currently 13 sunspot regions on the visible disc, however many of these are small or magnetically simple. The largest regions on the disc remain in the northwest, although one has started to show signs of decay and the other remains stable. The region in the southeast that had previously been the source of significant flare activity has also decayed over the past 24 hours. The most significant region on the disc is now perhaps a rapidly developing region in the northeast.
No significant Coronal Mass Ejections (CMEs) have been detected in available imagery during the last 24 hours.

Solar Wind / Geomagnetic Activity: Solar wind speeds started slightly elevated around 480 km/s but have steadily declined through the period to slow levels, The total Interplanetary Magnetic Field was weak, with the north-south component generally weekly negative. Geomagnetic activity was Quiet (Kp 0-2).

Energetic Particles / Solar Radiation: The count rate of energetic particles was at background levels with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is likely to be Moderate, with a slight chance of becoming High with any Strong flares.

Solar Wind / Geomagnetic Activity: Two eruptions occurring on 10th and 11th both gave CMEs which may give glancing impacts at Earth on Days 1 and 2 (13-14 Feb), although this is low confidence. There are no significant coronal holes in the forecast at present. In the absence of CME arrivals, wind speeds are most likely to remain at slow.
Geomagnetic activity is therefore expected to be mainly Quiet to Unsettled. Perhaps rising to Active to Minor Storm with a slight chance of Moderate Storm on Days 1 and 2 should the above mentioned CMEs arrive, with the risk reducing into Day 3 (15 Feb).

Energetic Particles / Solar Radiation: The count rate of energetic particles is expected to remain at background levels, but there is a slight chance of this reaching the S1/Minor radiation storm level in response to any significant flares that occur.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	30	40	10	1
Strong	G3	No	5	5	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	70	70	60	50
Very Active	R3 to R5 X	No	15	15	15	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	20	20	15	10
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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